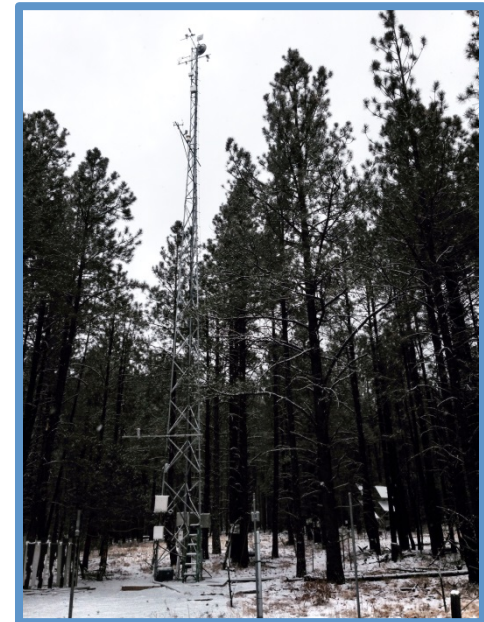
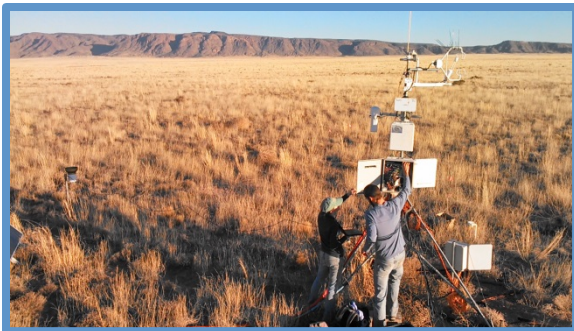


# AmeriFlux Data Manager Workshop New Mexico Elevation Gradient (NMEG)

Randy Lefevre

University of New Mexico

12 February 2014

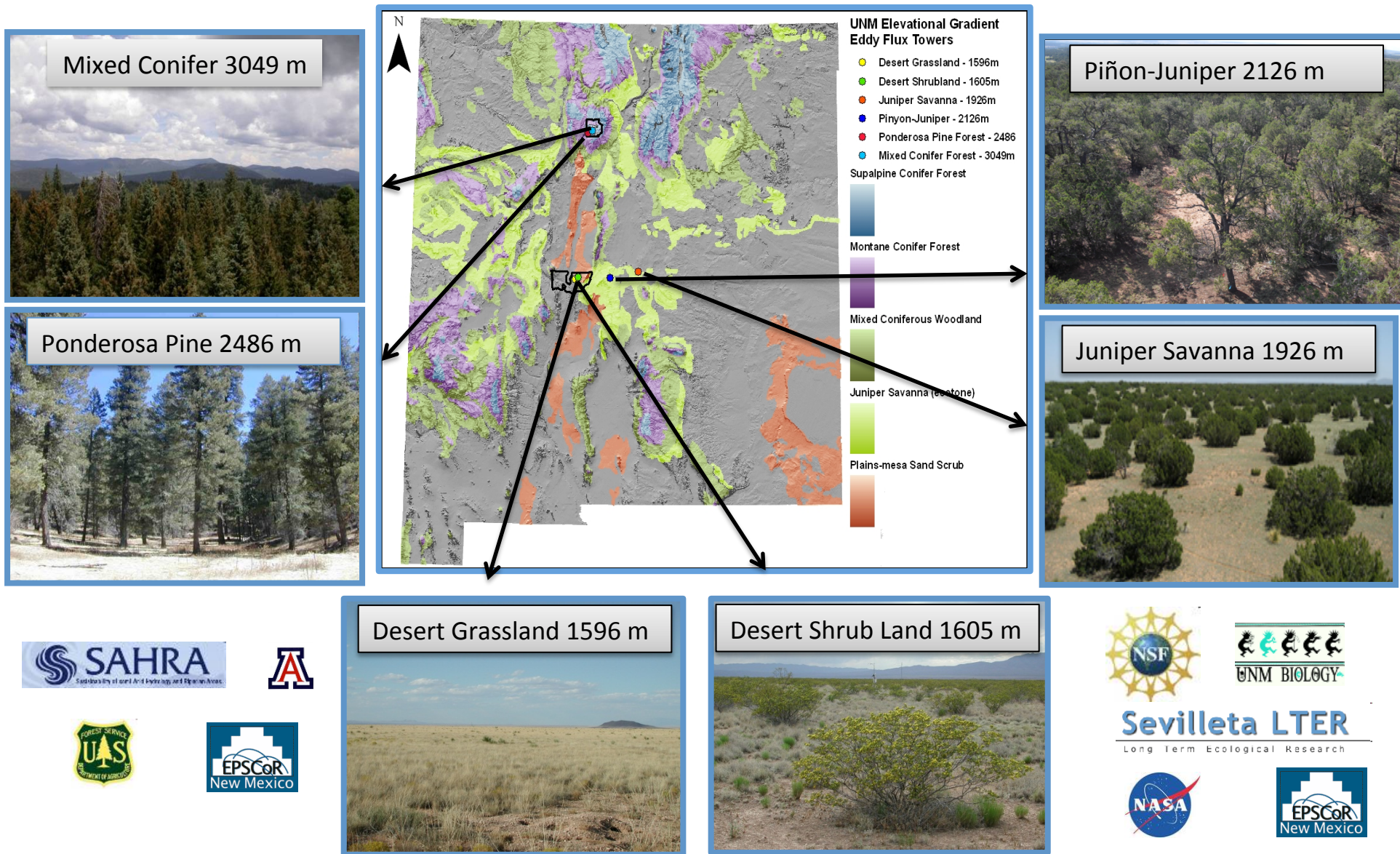


- New Mexico Elevation Gradient (NMEG) Sites
  - Ecosystems and Instrumentation
  - Six (6) Core Sites: Seg, Ses, Wjs, Mpj, Vcp, and Vcm
- Research Goals
- Our Team
- Significant Disturbances
  - Fire, Insect Outbreaks, and Land Management
  - Southwestern United States Continuing Drought
- Summary of Data Processing Pipeline
- Challenges & Potential AmeriFlux Management Project (AMP) Resources

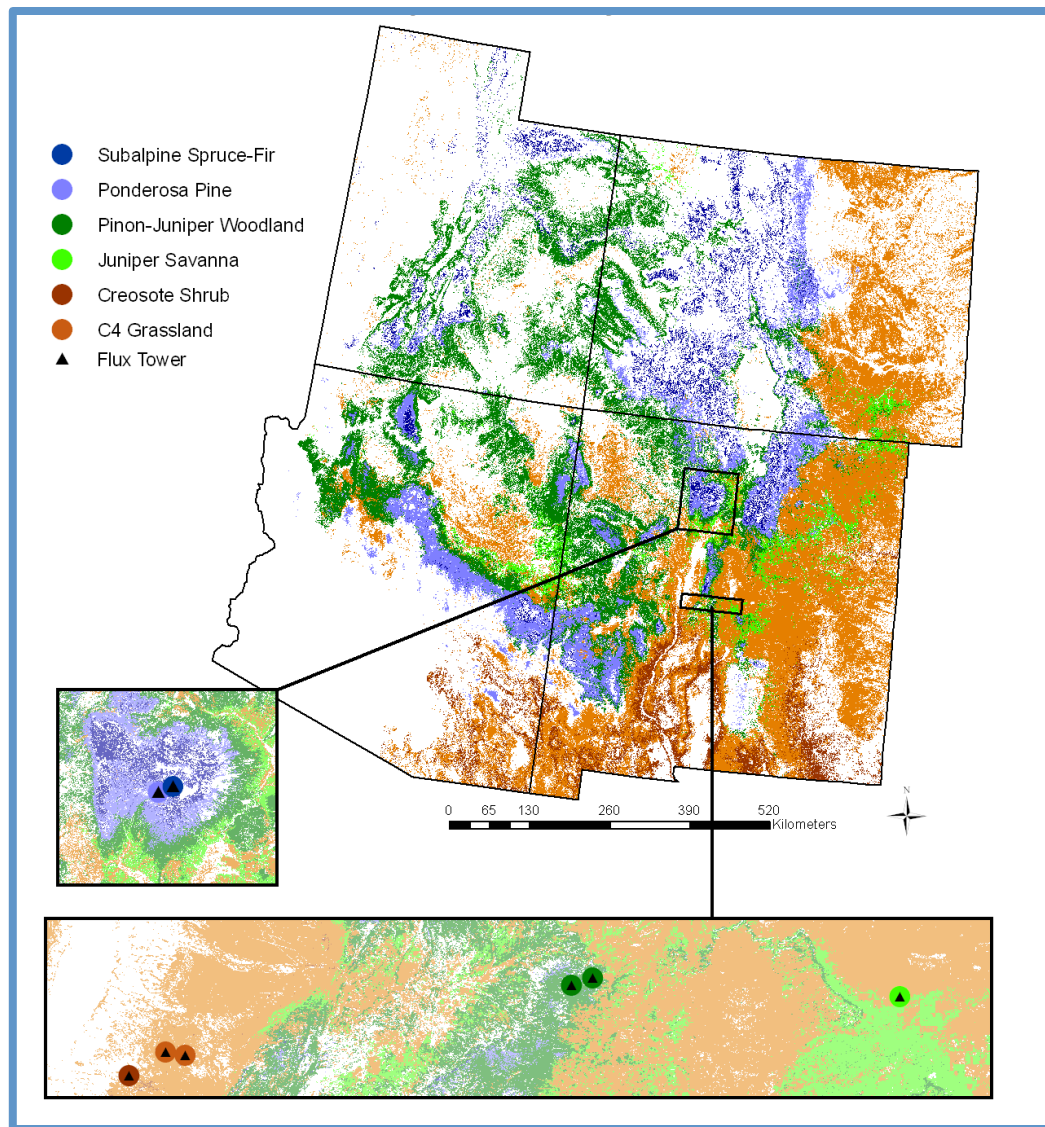


# NMEG Site Locations

## Gradient of Temperature and Precipitation



# Biomes Representative By NMEG



Tower sites and biomes represented in the NMEG network over a land cover map using data from the Southwest Regional Gap Analysis Project (SWReGAP) (<http://earth.gis.usu.edu/swgap>).



- Tower-based open-path eddy covariance (since 2007)
  - Net Ecosystem Exchange of carbon , Latent Heat flux, Sensible Heat flux
- Carbon pools
  - Aboveground biomass, leaf area index, coarse/fine woody debris, litter, soil
- Micrometeorological Variables
  - Air T, RH, Net radiation/ components, PAR, Soil T and H<sub>2</sub>O profiles
- Physiology
  - Leaf-level gas exchange, soil, foliar and bole respiration, sap flow, soil CO<sub>2</sub>, chlorophyll fluorescence
- Detailed Ecosystem Structure and Function
  - Airborne LiDAR (2011) and QuickBird (5 acquisitions, 2011-13)
  - NDVI and PRI sensors

**Radiation**



**Flux**



**Leaf Gas**



**Fluorescence**



**Biomass**



**Litter**



**Sap Flow**



# Research Goals

- Understand and quantify carbon, water, and energy sources/sinks and uncertainty in southwest US ecosystem dynamics and budgets
- Investigate the response of semi-arid terrestrial ecosystems to climate changes and catastrophic disturbances
- Incorporate remote sensing (airborne and space-based) analyses with flux tower intelligence as both input and validation data for Earth System Models, including Land Surface Models



# Our Team





# Significant Disturbances and Land Management

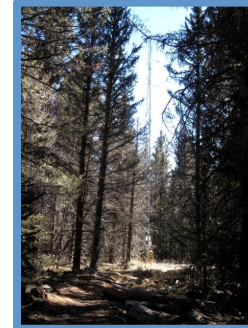
## Fire



Grassland (Seg), Aug 2009



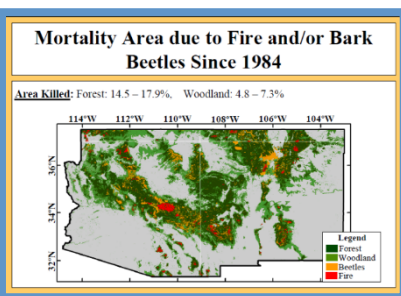
Las Conchas, NM 2011



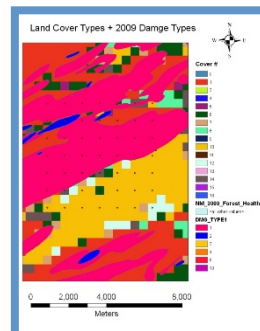
Mixed Conifer (Vcm), 2013



## Insect Outbreak



Williams et al., 2010



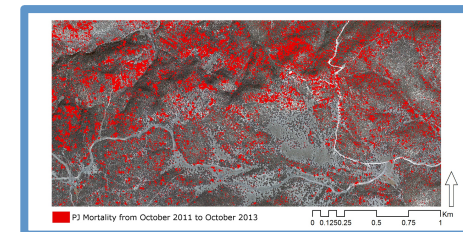
Spruce Budworm, Mixed Conifer (Vc) 2009-13



*Chorstoneura occidentalis*



Bark Beetle, Pinon Juniper (Mpj), 2013



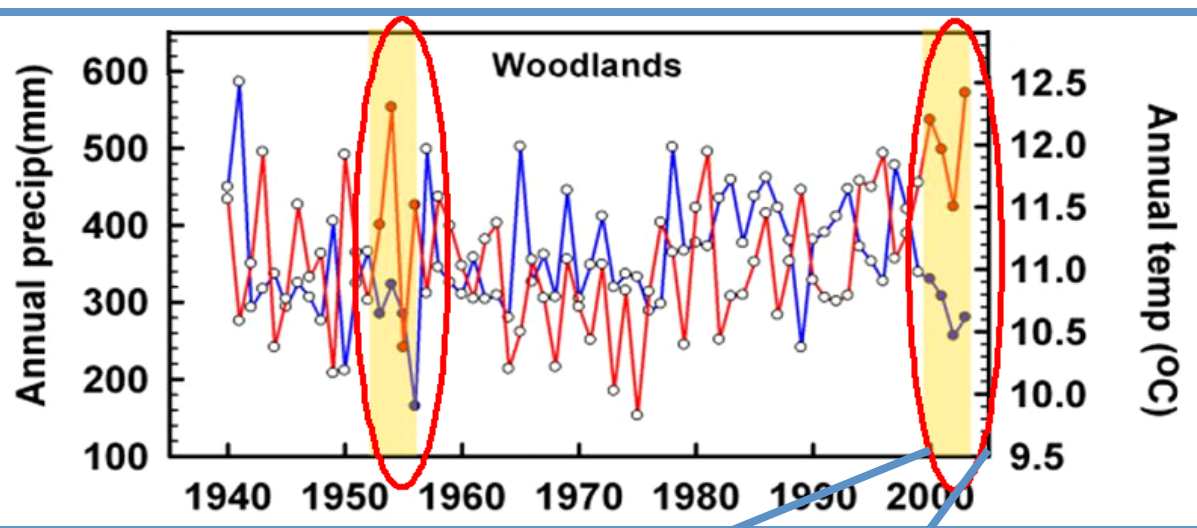
## Grazing / Woody Encroachment / Thinning



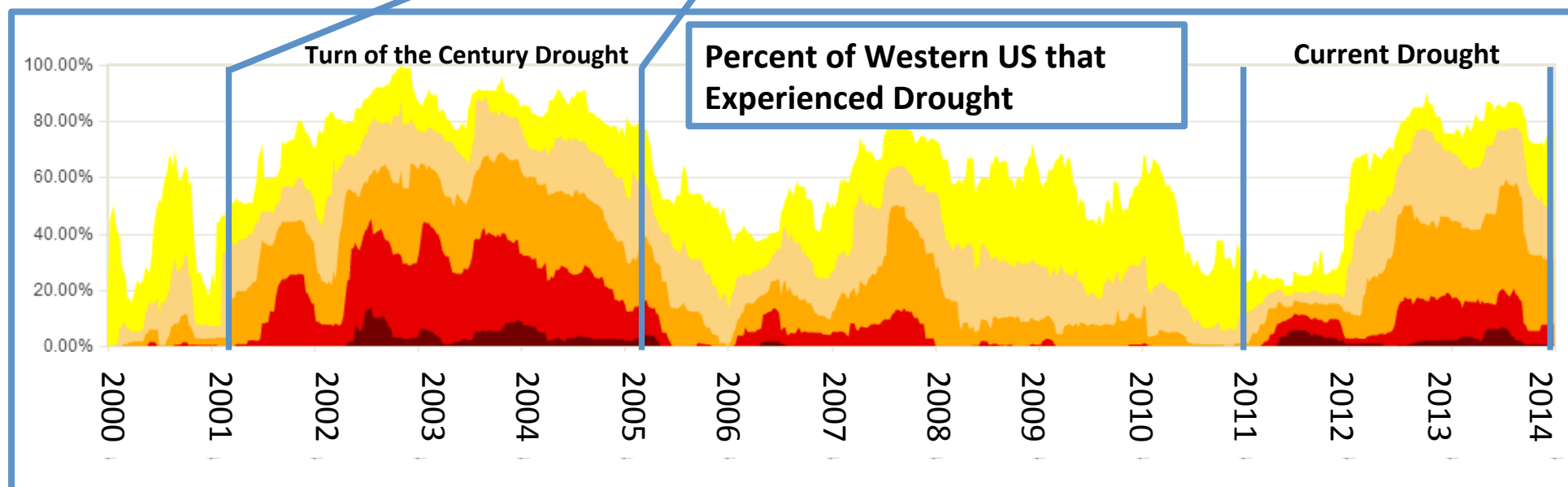
Palo Duro Canyon, Sev LTER, 1928, then 1999 25 years after livestock



# “Our” Greatest Disturbance



**Southwestern  
US is projected  
to become  
hotter and drier**



# Data Processing Pipeline

- Current (As Is)
  - Matlab-Based
  - Archive, Assimilate, Gross QC/QA, Local Gap Filling, Remote Gap Filling and Partitioning, AmeriFlux Format
  - Max Planck Institute (MPI) Gap Filling & Partitioning
- Near-Term Future Plan (To Be)
  - Python and R-Based
  - Archive, Standardize Pre-Processing and Gross QC, Local Gap Filling, Fine-Tune QC, Partition, AmeriFlux Format
  - Gap Filling and Partitioning Internally



# Challenges & AmeriFlux Help

- Keeping our instruments and sensors in peak performance through varying environmental conditions
  - Real-time diagnostics and erroneous data flagging
- Large amounts of diverse data
  - Verification and Validation of data at each step in the process
- Data analysis and visualization capabilities
- Equipment and instrumentation emergencies